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Traditional Study of Cutaneous Leishmaniasis in Basrah Province

Conflict of interest: nothing to declare.
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Abstract

Introduction. Cutaneous leishmaniasis (CL) is a major public health problem and an endemic disease in the Iraqi population.
Purpose. To detection and diagnosis of cutaneous Leishmania spp. in Basrah province.
Materials and methods. The study regions included districts in Basrah province, Iraq. The study period was one year from begging of December 2022 to the end of November 2023. A total of 450/1244 cases (200 females and 250 males) with cutaneous leishmaniasis were enrolled in this study. They attended the Dermatological and Venereology Department. A history was taken from each case according to a questionnaire sheet. Dermatological examination was performed for all cases with suspected CL. Each skin lesion was cleaned with iodine then about 0.5 to 1 ml of Lock's solution was subcutaneously injected at the peripheral edges of the lesion then directly used for suspected CL examination by direct smear and culture. Meteorological data on mean temperatures (C), precipitation rate (mm), mean humidity (%), and wind speed (m/s), in the province were obtained.
Results. The mean age of patients was 20.25±12.75 years and the median age was 14 years. The CL rate in males was high than in females (53.6% versus 46.4%). Higher infection rates were observed in December 2022, January 2023, and February 2023 (25.9%, 21.1%, and 16.7%, respectively). The results showed the rate of infection was higher in moderate mean temperatures (C°) (December, January, and February). Clinically, the upper limbs were the sites most commonly affected by CL, in 119 (25.2%) cases, followed by the head in 82(20.6%), and the lower limbs in 75 (16.5%). Regarding the types of CL lesions, plaques to pustule were common in 237 (77.2%) cases. CL lesions were almost wet in 389 lesions, while the rest (61) were dry. CL lesions manifested with pus discharge in 148 patients; lesions associated with itching were seen in 205 patients, with bleeding from lesion sites in 70 cases. The most common presentation was moderate forms in 290 cases, followed by severe 140 cases, and mild (20) cases.
Conclusion. The younger age has high susceptibility to have CL than older age. The predominant CL form and most widespread type in Iraq is L. major. The climate of Iraq is the most suitable for the growth and reproduction of sandfly, and thus for the spread of CL.

Keywords: leishmaniasis, Balkhsore, Baghdad boil, leishmania, L. tropica, L. major, intracellular protozoa

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Исследование кожного лейшманиоза в провинции Басра

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Резюме

Введение. Кожный лейшманиоз (КЛ) является серьезной проблемой общественного здравоохранения и эндемичным заболеванием среди населения Ирака.
Цель. Выявление и диагностика кожных Leishmania spp. в провинции Басра.
Материалы и методы. Регионы исследования включали районы провинции Басра, Ирак. Период исследования составил один год с начала декабря 2022 г. до конца ноября 2023 г. Всего в этом исследовании было зарегистрировано 450/1244 случаев (200 женщин и 250 мужчин) с кожным лейшманиозом. Они посещали дерматологическое и венерологическое отделения. Анамнез каждого случая собирался в соответствии с анкетным листом. Дерматологическое обследование проводилось для всех случаев с подозрением на КЛ. Каждое поражение кожи очищалось йодом, затем около 0,5–1 мл раствора Локка вводилось подкожно в периферические края поражения, затем непосредственно использовалось для предполагаемого исследования КЛ путем прямого мазка и посева. Были получены метеорологические данные о средних температурах (С), уровне осадков (мм), средней влажности (%) и скорости ветра (м/с) в провинции.
Результаты. Средний возраст пациентов составлял 20,25±12,75 года, а медианный возраст – 14 лет. Уровень КЛ у мужчин был выше, чем у женщин (53,6% против 46,4%). Более высокие показатели инфицирования наблюдались в декабре 2022 г., январе 2023 г. и феврале 2023 г. (25,9%, 21,1% и 16,7% соответственно). Результаты показали, что уровень инфицирования был выше при умеренных средних температурах (°C) (декабрь, январь и февраль). Клинически верхние конечности были местами, наиболее часто поражаемыми КЛ – в 119 (25,2%) случаях, затем голова – в 82 (20,6%) и нижние конечности – в 75 (16,5%). Что касается типов поражений КЛ, бляшки или пустулы были распространены в 237 (77,2%) случаях. Поражения КЛ были влажными в

389 поражениях, в то время как остальные (61) были сухими. Поражения КЛ проявлялись выделением гноя у 148 пациентов; поражения, связанные с зудом, наблюдались у 205 пациентов, с кровотечением из мест поражения – в 70 случаях. Наиболее распространенными проявлениями были умеренные формы в 290 случаях, за которыми следовали тяжелые – 140 случаев и легкие – 20 случаев.

Заключение. Более молодой возраст имеет более высокую восприимчивость к КЛ, чем пожилой возраст. Преобладающая форма КЛ и наиболее распространенный тип в Ираке – L. major. Климат Ирака наиболее подходит для роста и размножения москитов, а значит и для распространения КЛ.

Ключевые слова: лейшманиоз, Балхсор, багдадский нарыв, лейшмания, L. tropica, L. major, внутриклеточные простейшие

■ INTRODUCTION

Leishmaniasis is represent as one of the major vector-borne communicable diseases in the world. It is a zoonotic disease that is caused by obligatory intracellular protozoa of the genus Leishmania [1]. Haemo-flagellate Leishmania cause wide spread disease leading to serious public health disasters in communities overall the Mediterranean areas and the Middle East countries like Iraq [2, 3].

Epidemiological researches in the Middle East have shown that anthroponotic CL by L. tropica and zoonotic CL by L. major occur in Saudi Arabia, Iraq, Iran, Afghanistan, Pakistan, and Yemen [4]. Also, cases of CL and VL by L. tropica have been documented in Iran and Iraq [5].

The WHO considered CL as one of the six most common infectious parasitic diseases due to its high incidence rates and a potential reason for different dysfunctional and dysfiguring in patients [6].

Leishmaniasis is called "Balkhsore" in north Afghanistan, "Delhi boil" in India and "Baghdad boil" in Iraq [7]. It is endemic in Iraq, where both forms of the disease, cutaneous and visceral, are found [8].

There are many methods for diagnosing the parasite. They include microscopic examination of direct smears using Giemsa stain or Leishman stain, culturing on Novy – MacNeal – Nicolle (NNN) medium, histopathology, serology, and specific molecular techniques based on detecting the parasite DNA using polymerase chain reaction (PCR) to amplify the Leishmania genome [9].

Globally, leishmaniasis is one of the three major neglected tropical diseases after malaria and filariasis. There are more than one billion people at risk of exposure to this disease [10]. There are more than twelve million cases of leishmaniasis around the world, and one to two million new cases are recorded annually [11]. This is because of several different factors that may be related to the environment and/or be man-made, including: demographics, poverty, large migrations, deforestation, lack of public health awareness, immunosuppression, urbanization, vector distribution, traveling between endemic and non-endemic areas, and the possibility of the production of new Leishmania hybrids [12–14].

In 2020, WHO published a report about the distribution of endemic countries for CL from 2014 to 2018. The report divided the world into six territories: Europe (53 countries), Americas (36 countries), Africa (47 countries), South-East Asia (11 countries),

Eastern Mediterranean (22 countries), and Western Pacific (31 countries). The highest endemicity status of CL was 82%, which was recorded in the Eastern Mediterranean (18 of 22 countries). Eastern Mediterranean countries experienced 187,262 out of 251,553 new cases of CL reported in 2018. On other hand, the Americas and European territories reported endemicity of 58%, and 48%, respectively. The African and South-East Asian regions had approximately half the endemicity rate of Eastern Mediterranean (40% and 36%, respectively). The region of lowest endemicity was the Western Pacific, which was responsible for only 3% of cases [15].

Seven countries represented eco-epidemiological "hotspots" for leishmaniasis: Syrian Arab Republic, Iran (Islamic Republic of), Algeria, Afghanistan, Brazil, Iraq, and Pakistan [15] (Table 1).

In Iraq, CL is an endemic disease and extremely common in Baghdad. The most endemic areas before 1991 were central Iraq and the greater Baghdad area. Sharquie et al. [16] documented a considerable number of cases from the Sheik Saad areas in Misan as well as Basra, but the most endemic areas were Baghdad and Mosul.

Diagnosis of CL is depending on clinical and parasitological examination. Amastigotes can be diagnosed by microscopic examination of lesion smear samples after staining with Leishman's or Giemsa stain. Promastigotes can be growing and isolating in culture

Table 1
Number of new cases of CL reported between 2014–2018 [15]

Country	2014	2015	2016	2017	2018
Afghanistan	19065	29392	34912	32065	38407
Algeria	5423	7523	10678	13106	10847
Brazil	20418	19395	12690	17526	16432
Colombia	11586	7541	10966	7764	6362
Egypt	1444	2243	643	566	1161
Ethiopia	342	534	425	1111	882
Iraq	2691	17525	17566	18854	11426
Islamic Republic of Iran	16024	18607	14536	12108	15485
Italy	80	76	47	No data	70
Jordan	182	70	126	155	150
Kuwait	2	0	7	1	4
Libya	516	1632	2662	2815	2977
Morocco	2555	2809	4903	6802	ND
Pakistan	14634	16648	27151	8024	19361
Palestine	352	387	199	260	199
Peru	6231	5459	7271	6631	6321
Saudi Arabia	2190	1490	1337	1007	921
Spain	100	40	167	172	No data
Sudan	1053	3503	3011	4107	4726
Syrian Arab Republic	53876	50972	47377	53232	80215
Tunisia	3368	6611	6065	4774	7467
Turkey	1678	1986	1474	No data	1554
Uzbekistan	311	508	766	740	643
Yemen	5000	4063	9120	4525	4763

(N.N.N. medium) from different samples, leading to more sensitive findings [17]. The differential diagnosis of CL including tropical ulcers, infected insect bites, impetigo, lupus vulgaris, yaws, tertiary syphilis, leprosy, blastomycosis, and skin cancer. Whenever there is suspicion of CL, the laboratory diagnosis only can give hint for the final detection [18].

■ PURPOSE

To detection and diagnosis of cutaneous Leishmania spp. in Basrah city.

■ MATERIALS AND METHODS

Study design and setting

The study regions included districts in Basrah province, Iraq. The study period was one year from begging of December 2022 to the end of November 2023.

Patient samples

A total of 450/1244 cases (200 females and 250 males) with cutaneous leishmaniasis were enrolled in this study. They attended the Dermatological and Venereology Department. A history was taken from each case according to a questionnaire sheet. Dermatological examination was performed for all cases with suspected CL.

Samples aspiration

Each skin lesion was cleaned with iodine then about 0.5 to 1 ml of Lock's solution was subcutaneously injected at the peripheral edges of the lesion then directly used for suspected CL examination by direct smear and culture [19]. A swabs from patients with ulcerative or cystic skin lesions were done [19, 20].

Climate data

Meteorological data on mean temperatures (°C), precipitation rate (mm), mean humidity (%), and wind speed (m/s), in the province were obtained.

Statistical analysis

All data collected were entered for statistical analysis into the Statistical Package for Social Sciences version 24 (SPSS v24) (SPSS Inc., Chicago, Illinois, USA). Descriptive statistical analysis was performed. The mean, standard deviation, and range were used to described numerical data. Categorical data are presented as frequencies and percentages. Differences of percentages between groups were assessed with Chi-square or Fischer's exact test. A P-value ≤0.05 was considered statistically significant.

■ RESULTS

The mean age of patients was 20.25±12.75 years and the median age was 14 years. Ages ranged from 8 months to 66 years. High rates of CL were found in patients aged 8 months to 10 years, with the lowest rate recorded in the group aged more than 60 years. The CL rate in males was high than in females (53.6% versus 46.4%). Fifty cases were known to have diabetes mellitus (DM), suffered from a severe form of CL (Table 2).

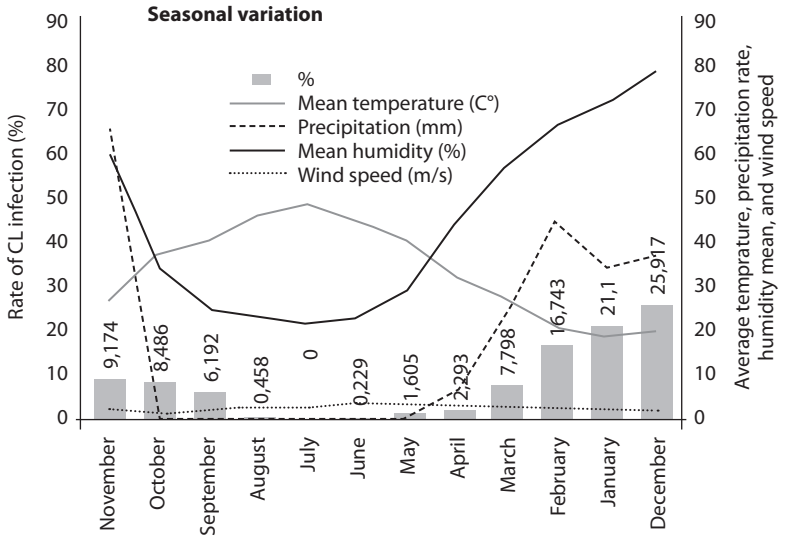
Higher infection rates were observed in December 2022, January 2023, and February 2023 (25.9%, 21.1%, and 16.7%, respectively). The results showed the rate of infection was

Table 2
CL according to demographic

Variables	No.	%
Age group (years)		
10	198	45.4
11–20	98	22.4
21–30	49	11.2
31–40	34	7.7
41–50	30	6.8
51–66	27	5.2
Gender		
Male	250	53.6
Female	200	46.4
Comorbidity		
Positive	50	8.3
Negative	400	91.7

higher in moderate mean temperatures (°C) (December, January, and February), whereas the rate declined during the hotter months of April, May, June, August and September (2.2%, 1.6%, 0.2%, 0.4%, and 6.2%, respectively), but in July, the rate was zero. The rates were moderately high in the rainy months of November, December, January, and February. November, December, January, and February had high humidity associated with high rates of infection (Figure).

Clinically, the upper limbs were the sites most commonly affected by CL, in 119 (25.2%) cases, followed by the head in 82 (20.6%), and the lower limbs in 75 (16.5%). Regarding the types of CL lesions, plaques to pustule were common in 237 (77.2%) cases. CL lesions



Rate of cutaneous leishmaniasis in relation to mean temperature (°C), precipitation (mm), mean humidity (%) and wind speed (m/s)

Table 3
Rate of CL in relation to the clinical features of lesions

Features	No.	%
Site		
Head	82	20.6
Neck	6	1.4
Upper limbs	119	25.2
Lower limbs	75	16.5
Other sites	153	35.09
Nature		
Nodule	16	3.4
Plaque-Pustule	237	77.2
Ulcer	84	19.3
Types		
Wet	389	86.9
Dry	61	13.1
Symptoms and signs		
Redness	8	1.6
Itching	205	54.1
Bleeding	70	16.1
Pus discharge	148	27.3
Severity		
Mild	20	4.8
Moderate	290	64.9
Severe	140	30.3

were almost wet in 389 lesions, while the rest (61) were dry. CL lesions manifested with pus discharge in 148patients; lesions associated with itching were seen in 205 patients, with bleeding from lesion sites in 70 cases. The most common presentation was moderate forms in 290 cases, followed by severe 140 cases, and mild (20) cases (Table 3).

■ DISCUSSION

Younger age groups are more susceptible to CL infection. The study found 13 cases aged less than one year with severe and multiple lesions of CL. These results agree with the findings of another study in the Iraqi city of Kirkuk [21]. Also, these results were similar to that of Abdulwahab, [22], in Diyala, she found the age group most affected by CL was 0–14 years in both sexes (31.70%) and the lowest frequency was 11.60% in the age group >50 years, while our percentage of CL infection was higher than that reported [23], of 35.50% in Anbar province. In another study, 20.0% of CL occurred in the 1–10-year age group in Salah-Adeen and Baghdad provinces [24]. In Al-Diwanyiah city, a study conducted by Abdlkadim [25] found 31% of 10–20-year-olds were infected with CL. Recently, a study by Ghezzai et al. [26] in Al-Najaf city recorded 6.2% of CL patients were aged <10 years. In neighboring countries such as Iran, Mokhtari et al. [27] reported a similar pattern. In Turkey, Eksi et al. [28] said that CL can infect individuals at any age.

Both sexes were exposed to CL infection without significant differences. This could be explained by the influence of society, customs, and traditions on sex. Males are more susceptible to infection because of movement and work in fields and farms outside,

whereas in general women remain at home, and particularly in Islamic countries the women wear long clothes. As a result, the exposed parts of the body in women are less than those of men. All of these are reasons to make men more susceptible to being bitten by sandflies. These findings were supported by other studies in Iraq [22]. In Iran, a study by Nilforoushzadeh et al. [29] found more females with CL (38.2%) than males (6.8%). Similar results were reported in Turkey by Aksoy et al. [30]. However, our results differ from another study done by Saki et al. [31] in Iran, which found that CL was more common in females (54.68%) than males (45.31%).

The highest infection rate of CL was recorded during months of rainfall, when the temperature was moderate but the humidity was very high. These findings are similar to those reported by Al-Obaidi et al. [32] from a study in Tikrit, but not similar to those reported in Afghanistan [33] and Iran [34]. These results were similar to those of other studies conducted in Iraq, where it was found that the highest frequency of CL recorded was in February (36.66%) then January (23.33%), with the lowest rate in May (1.66%) [22]. A study of the seasonal distribution of CL, from 2012 to 2016, showed the highest rate of leishmaniasis recorded in the Winter, which was 68.30%, followed by the Spring (19.30%), then a decline in the Summer (7.30%), with the lowest rate recorded in the Autumn (5.10%) [35].

The most common sites of cutaneous lesion were on the upper and lower limbs (50.10%), followed by the face (49.60%), and the lowest rate in the trunk (0.20%) [35], but Al-Obaidi et al. [32] found the face and feet were the sites most commonly affected by lesions. Other studies in several places of the world, in Turkey [36], Colombia [37] and Iran [34] reported similar data. However, there was disagreement with our results mentioned by Sharquie et al. [16], who found that lesions mainly occurred on the lower limbs and less frequently on the face in Saudis patients. Some authors mentioned that the main part of the body infected with CL was the upper limbs and hands (38.50%), followed by the face (25.00%), then the lower limbs and feet (21.50%), while the lowest frequency of infection (15%) was in other parts of the body [22]. CDC recommend that, to decline the amount of skin exposure(uncovered) to sandfly biting, to the level that is tolerable in the weather, wear long-sleeved shirts, pants, and socks [3].

The papules in this study represented the most common type of skin lesion recorded, followed by plaques. This may be affected by the medical educational level of the patients, their level of awareness, the use of herbs, and chemicals, that used without consulting a doctor, which in summation represented all factors leading to increases in the degree of skin damage and to be worse. The lesions appear as sores, which can vary in size and looking over time. They may begin out as papules or nodules, and may grow up as ulcers; skin ulcers may be covered by a scab or crust. The sores are painlessly [19, 38]. The appearance of different skin manifestations mainly depends on the length of time before patients seek medical care or visit a dermatologist to receive the correct or a valid treatment [19].

Wet lesions were highest percentage of lesions examined in this study, with fewer dry lesions detected. These findings were in consistent with Iraqi study [8], and with other countries studies, such as Pakistan [39], Iran [34], and Afghanistan [33], but in disagreement with another study in India by [40]. The high percentage of wet forms may be because the presence of large numbers of reservoir hosts in some regions, especially dogs and rodents, which is agree with [8].

■ CONCLUSION

The younger age has high susceptibility to have CL than older age. The predominant CL form and most widespread type in Iraq is L. major. The climate of Iraq is the most suitable for the growth and reproduction of sandfly, and thus for the spread of CL.

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